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Timing and Number of Applications of Triadimefon (Bayleton) Needed for Control of Cedar Leaf Blight on Western Red Cedar at Humboldt Nursery

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ABSTRACT

Timing and number of spray applications of triadimefon (Bayleton 50 WP at 1 lb/acre) were varied to determine if a reduced number of applications could be made while still achieving adequate control of cedar leaf blight. Monthly application (April through August) was compared to treatment every other month, treatment monthly April - June, application in April and June only, and no treatment. Disease severity was low with no significant difference between treatments applied monthly from April - August, every other month, and April, May and June treatment. There was no significant difference between means for height or caliper for all treatments tested. Three applications of triadimefon sprayed either in April, May, and June or April, June, and August should provide adequate protection against cedar leaf blight.

INTRODUCTION

Cedar leaf blight, caused by the fungus Didymascella (Keithia) thujina (Durand) Marie is a persistent pest on western red cedar seedlings at the Humboldt Nursery in northern California. In 1988, over 60,000 bareroot seedings were culled at the nursery, due to moderate to heavy foliage loss brought on by fungal infection. Cedar leaf blight is found along the Pacific Coast as far north as British Columbia where it is damaging to containerized seedlings. The fungus was introduced to Europe from North America and has caused serious losses in nurseries in southern Britian and France (Dennis and Sutherland 1989).

In 1989, a fungicide trial was conducted at the Humboldt Nursery comparing the efficacies of fixed copper, benomyl and triadimefon (Bayleton) for protection against cedar leaf blight (Frankel 1990). Triadimefon (Bayleton 50 WP, at 1 lb/acre) sprayed at monthly intervals from March to November, reduced infection to tolerable levels.

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Triadimefon (Bayleton) is 1 - (4 -Chlorophenoxy) -3, 3-dimethyl -1-(1H-1,2,4-triazol-1-yl)-2-butanone. The 50% WP formulation has a "warning" signal word on its label. No specific systemic symptoms of overexposure are known to occur in humans, although slight eye irritation may occur from contact with the powder or spray mixture (Mobay 1989). The material is registered for use on specified diseases of field, fruit and vegetable crops but not on conifer seedlings. The chemical is also available in a 25% WP formulation. The 25% WP turf and ornamental label includes use in California on pine trees for rust diseases and Sirococcus. Registration in California of both the 50% and 25% WP for use against cedar leaf blight in conifer nurseries is pending.

The purpose of this trial was to determine if the timing and number of triadimefon sprays could be altered, so western red cedar seedlings remained protected from the disease but the amount of chemical applied and cost of application was reduced.

METHODS

Plots were established in 1-0 western red cedar at the USDA Forest Service Humboldt Nursery in northern California. A randomized complete block design was used with the 5 treatments replicated 4 times. Each replicate measured 20 feet of bed (4 x 5 foot plots). All treatments consisted of triadimefon (Bayleton 50 WP, 1 lb/ acre (2.3 g/gal.) applied using a backpack sprayer with foliage sprayed to run-off on the following schedules:

1. Application monthly April through August (Ap-M-Jn-Jy-Au).
2. Application every other month from April to August (Ap-Jn-Au).
3. Application monthly from April through June (Ap-M-Jn).
4. Application every other month from April through June (Ap-Jn).
5. Control, water only, applied monthly from April through August.

Near the end of the growing season (October 31, 1990) 20 randomly selected seedlings from each plot were harvested for disease evaluation and growth measurements. Seedlings were clipped at the soil line, height and caliper at the base were measured, and disease incidence rated. Severity of disease was rated on a 5 point scale, where 1 = less than 20% of foliage infected, 2 = 21-40% of foliage infected, 3 = 41-60% of foliage infected, 5 = 81-100% of foliage infected. Analysis of variance was used for comparison of means. An arcsine transformation was done on disease rating variable, to convert percentages which have a binomial distribution, into a normal distribution. Statistical analysis was done on an HP97 calculator with the "Oneway" program.

RESULTS AND DISCUSSION

Seedlings treated every other month from April to August (Ap-Jn-Au), those treated monthly from April through June (Ap-M-Jn) and those treated monthly (Ap-M-Jn-Jy-Au) were adequately protected from cedar leaf blight. There was no significant difference (p=0.05) between disease severity rating for these treatments. Seedlings treated in April and June only, and control treated seedlings were lightly to moderately infected with the fungus, at levels significantly different (p=0.05) from other treatments. There were no significant differences (p=0.05) among any of the treatments for height and

caliper. Seedling height averaged 20.90 cm and caliper averaged 5.6 mm. Disease rating averaged 1.45 (See Table 1).

Table 1. Disease severity, height and caliper of western red cedar seedlings sprayed with triadimefon 50% WP at 1 lb/acre at various times for protection against cedar leaf blight. Disease rating is based on a 5 point scale, where 1 = less than 20% of foliage infected, 2 = 21-40% of foliage infected, 3 = 41-60% of foliage infected, 5 = 81-100% of foliage infected.

Treatment timing	Disease rating[1]	Height[1] (cm)	Caliper[1] (mm)
Ap-M-Jn-Jy-Au	0.76a[2]	21.58a	6.0a
Ap-Jn-Au	0.74a	21.12a	5.6a
Ap-M-Jn	0.98a	20.68a	5.5a
Ap-Jn	1.28b	21.96a	6.0a
Control	2.59c	19.42a	5.1a

[1]Average of 80 randomly selected seedlings per treatment.

[2]Values followed by the same letter are not significantly different (p=0.05).

Didymascella fruiting bodies were found on seedlings in all treatments. Six percent (6%) of the 400 seedlings examined appeared to be disease free. Disease-free seedlings were found in all treatments except the control treatment. Untreated control seedlings had an average disease rating of 2.59 with approximately 30 - 50% of their foliage showing external symptoms of cedar leaf blight. In 1988, the disease was more severe with untreated seedlings averaging from 61-80% of foliage infected. This may be due to less favorable climatic conditions for the fungus in 1990 and a reduction of inoculum level in the nursery due to fungicide application in adjacent western red cedar beds. It is uncertain whether schedules which worked in this trial would have provided adequate protection if conditions were more conducive to disease development.

In the 1989 trial, seedling density did not seem to affect the level of disease infection. This was seen again in 1990, with both densely planted and spotty areas in beds containing seedlings that were similarly infected.

Further testing is needed to determine if the application rate of triadimefon can be lowered and still provide protection against cedar leaf blight. A trial is scheduled for the 1991 growing season which will test several application schedules of triadimefon at 1/2 the rate used in these tests.

CONCLUSIONS

Sprays of triadimefon (Bayleton 50% WP at 1 lb/acre) every other month from April through August (Ap-Jn-Au) or monthly spray from April through June

(Ap-M-Ju) both provided adequate protection against cedar leaf blight of western red cedar. Applications of triadimefon may be reduced from the formerly recommended schedule of monthly applications from April to November. Three applications of triadimefon sprayed either in April, May, and June or April, June, and August should provide adequate protection against cedar leaf blight.

LITERATURE CITED

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